



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/464,311	12/15/1999	QIMENG CHEN	10991149-1	7356

22879 7590 03/09/2004

HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER

ROBINSON BOYCE, AKIBA K

ART UNIT	PAPER NUMBER
----------	--------------

3623

DATE MAILED: 03/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/464,311

Applicant(s)

CHEN ET AL.

Examiner

Akiba K Robinson-Boyce

Art Unit

3623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,6,7,9-11,16-22 and 25-27 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 4, 6, 7, 9-11, 16-22, 25-27 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/3/04 has been entered.

Status of the Claims

2. In response to the communication received on 2/3/04, the following is a non-final office action. Claims 1, 3, 4, 6, 7, 9-11, 16-22 and 25-27 are pending in this application and have been examined on the merits. The following rejection reflects the amendment submitted 2/3/04. Claims 1, 3, 4, 6, 7, 9-11, 16-22 and 25-27 are rejected as follows.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3, 4, 6, 7, 9-11, 16-22, 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murad et al (US 6,526,389), and further in view of McDonough et al (US 6,115,693).

As per claim 1, Murad et al discloses:

Processing circuitry operative to process customer telephone call records, (Col. 3, lines 25-32, represented by the programmable controller);

A data warehouse coupled with the processing circuitry and configured to store the processed customer telephone call records, (Col. 4, lines 18-19, represented by the memory);

At least one computer program, performed by the profiling engine, and operative to define behavior profiles defined at least in part by probability distributions, using data from the telephone call records, as data cubes and derive similarity measures on patterns extracted from the behavior profiles, (Col. 8, lines 61-65, Col. 10, lines 24-36, represented by the method being computer implemented, and where the behavior profiles are represented by prototypical first behavior profiles and similarity measures are represented by matches and differences, Col. 5, lines 10-14, where the profile **304** is shown to represent a multi-dimensional probability distribution of calls);

Wherein the behavior profiles are provided as two input calling pattern cubes, C1 and C2, and a similarity cube, Cs, is an output of a comparison between C1 and C2, wherein the similarity cube Cs, represents a pair of corresponding sub-cubes of C1 and C2, (Col. 8, lines 15-20, where the two input calling pattern cubes are represented by

two instances of the second level profile where the second level profile represents extracted call prototypes).

Murad et al fails to disclose the following, however McDonough et al discloses:

An On Line Analytical Processing (OLAP) based scalable profiling engine communicating with the data warehouse and operative to build and up data customer behavior profiles by mining the customer telephone call records that flow into the data warehouse, (Col. 11, lines 29-34 and Col. 12, lines 50-53, where the statistics represent the customer profiles).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to incorporate OLAP into the Murad et al patent with the motivation of accurately analyzing trends in a telecommunications environment.

As per claim 3, Murad et al fails to disclose the following, however McDonough et al discloses:

Wherein the profiling engine comprises a commercial data warehouse server, (Col. 7, lines 47-51, represented by the statistics server);

The following is obvious with McDonough since McDonough teaches that an OLAP tool is used to analyze trends and statistics for operational management of the environment (See Col. 11, lines 29-33). In this type of situation, an OLAP server is necessary to provide the services of accessing the proper trend files and routing these trend files to other computers in the network for analysis. Without the OLAP server, the OLAP tool would have no way of keeping the trend files in order for proper analysis:

and a multi-dimensional OLAP server;

As per claim 4, Murad et al discloses:

Wherein the profiling engine implements multi-level, multi-dimensional pattern analysis and comparison, (Col. 9, lines 6-15 w/lines 39-44, where each dimension of the multi-dimensional probability distribution has a corresponding cumulative distribution and where the analysis and comparison is represented by weighted summing of the squared differences between the cumulative distribution of the first behavior profile and each remaining first behavior profile at each attribute)

As per claim 6, Murad et al discloses:

Wherein similarity measures are defined and computed on the patterns extracted from the behavior profiles, (Col. 9, lines 39-44, represented by the cumulative distribution of behavior profiles).

As per claim 7, Murad et al discloses:

Wherein the computer program is further operative to compare the data cubes with similarity measures identifying fraud so as to extract fraud detection from the behavior profiles, (Col. 8, lines 10-15, represented by comparing the threshold value to determine if the daily profile is fraudulent or unusual).

As per claim 9, Murad et al discloses:

Wherein the behavior profiles are analyzed against a...threshold to detect caller fraud, (Col. 10, lines 30-39, represented by the comparison of the behavior profiles to identify a deviation from the normal behavior where the deviation is designated as fraudulent).

Murad et al fails to disclose that the behavior profiles are personalized, however, McDonough et al discloses this feature in Col. 6, lines 63-66 where it is disclosed that a script enables a customer profile to be identified and the content of the script is personalized for the customer.

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention for the behavior profiles to be analyzed against a personalized threshold with the motivation of treating and analyzing each customer individually according to their own individual behavior.

As per claim 10, Murad et al discloses:

Wherein the customer records comprise customer call records, the profiling engine builds and updates customer calling behavior profiles by mining the customer call records, and at the computer program derives similarity measures on patterns extracted from the call behavior profiles, (Col. 3, lines 25-32, where the customer records are represented by the customer call records, Col. 6, lines 55-61, where the building and updating of customer calling records is represented by the update of the clusters of daily profiles, Col. 10, lines 24-36, where the derivation of similarity measures is represented by the comparison to identify a deviation from normal behavior profiles).

As per claim 11 Murad et al discloses:

A data warehouse for storing customer records including telephone call data, (Col. 4, lines 18-19, represented by the memory);

A profiling engine configured to communicate with the data warehouse and operative to generate customer telephone calling behavior profiles from the customer record within the data warehouse, the profiling engine being configured to define customer telephone calling behavior profiles using probability distributions, (Col. 11, lines 26-35, represented by the means for obtaining a plurality of first behavior profiles), on multi-dimensional and multi-level data cubes, one multi-level data cube being a profile cube (Col. 6, lines 55-59 represented by the daily profile), another multi-level data cube being a profile-snapshot cube, (Col. 6, line 62-Col. 7, line 2, represented by the daily prototype referred to as the second level profile processing), and yet another data cube being a profile cube formed by merging together the profile cube and the profile-snapshot cube, (Col. 7, lines 3-17, represented by the third level overall profile);

a computer application program implemented on the profiling engine and operative to represent behavior profiles as patterns, using the telephone call data, and derive similarity measures of the patterns usable to profile customer behavior and detect fraud, by deriving calling pattern cubes from the profile cubes, (Col. 8, lines 61-66 w/ Col. 10, lines 30-39, where the computer application program is represented by the computer implemented method and the similarity measures are represented by the deviation from the normal behavior profile, Col. 3, lines 46-54, where call similarities or dissimilarities are obtained from the first level profile, Col. 4, lines 40-45, [where the depicted squares represent count-cubes, esp. the Nth call prototype, which represents a profile])

using a probability distribution-based calling pattern, treating a sub-cube as a bag, and summarizing cell-wise comparison results based on bag overlap, (Col. 7, lines 58-65, w. Col. 8, lines 10-20, where the distance factor based on the Cumulative Distribution is determined in Col. 5, lines 52-Col. 6, line 5. In this case, the distance factor based on the Cumulative Distribution represents bag overlap using probability distribution-based calling pattern since when calculating the distance factor, if the value is negative, then the daily profiles {represented by cells} would overlap]).

Murad et al fails to disclose the following, however McDonough et al discloses:
and to compute the customer telephone-calling behavior profiles using OLAP operations, (Col. 11, lines 29-34 and Col. 12, lines 50-53, where the statistics represent the customer calling behavior profiles).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to incorporate OLAP into the Murad et al patent with the motivation of accurately analyzing trends in a telecommunications environment.

As per claim 16, Murad et al discloses:

Wherein the updated profile cube is stored within a profile table of the data warehouse such that subsequent customer profiling utilizes customer records from the data warehouse comprising the updated profile cube, (Fig. 2B, Col. 4, lines 41-45 w/ Col. 6, line 55-Col. 7, line 16, where the updated profile cube is represented by the call prototype).

As per claim 17, Murad et al discloses:

Providing call data in the form of call data records to a data warehouse, (Col. 4, lines 18-19, represented by the memory);

Generating a profile-snapshot cube accommodating multiple customers;(Col. 10, lines 24-25, represented by the first behavior profile for each cluster)

In combination with generating the profile-snapshot cube, generating a profile cube for the same set of customers from the data warehouse, (Col. 10, lines 26-37, where the data warehouse is shown by the arrangement of the records);

Updating the profile cube by merging the profile cube with the profile-snapshot cube, (Col. 7, lines 3-17, represented by the third level overall profile);

Storing the updated profile cube in the data warehouse, (Col.8-19, represented by the entry in the overall profile vector);

Murad et al fails to disclose the following, however, the following is obvious with McDonough since McDonough teaches that an OLAP tool is used to analyze trends and statistics for operational management of the environment (See Col. 11, lines 29-33):

Loading the call data records into a multidimensional database of an OLAP server.

In this type of situation, an OLAP server is necessary to provide the services of accessing the proper trend files and routing these trend files to other computers in the network for analysis. Without the OLAP server, the OLAP tool would have no way of keeping the trend files in order to have proper analysis.

Murad et al also fails to disclose the following:

Maintaining profiles by staging data between the data warehouse and the OLAP multidimensional database, (Col. 11, lines 18-33, where the data warehouse is represented by the statistics being gathered by event resources and the It would have been obvious to one of ordinary skill in the art to maintain the profiles by staging data between the data warehouse and the OLAP multidimensional database with the motivation of taking this already stored data and making it accessible for reporting.

As per claim 18, Murad et al discloses:

Wherein the data warehouse comprises profile tables configured to store the profile cube, (Col. 4, lines 41-45, and Fig. 2B, where the profile cube is represented by each depicted square)

As per claim 19, Murad et al discloses:

Wherein the updated profile cube is subdivided into a plurality of individual calling pattern cubes, each representative of individual customers, and further comprising comparing calling patterns that have been derived from customer calling behavior profiles, Col. 4, lines 41-45, where each depicted square represents a call prototype/profile where each call is made by a customer, Col. 3, lines 46-54, where the calling patterns are represented by the call that has a prototype similar or dissimilar and the calling behavior profiles are represented by the first level profile).

As per claim 20, Murad et al discloses:

Further comprising the steps of...analyzing...of one of the calling pattern cubes for an individual customer, (Col. 10, lines 30-38, esp. lines 33-39, where determining the difference represents the analyzing step).

Murad et al fails to disclose the following, however McDonough et al discloses:

Reporting and visualizing, (Col. 4, lines 31-34, and lines 38-40, represented by reporting of performance data and displaying performance data).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to report and visualize the calling pattern cubes with the motivation of producing a physical document that users can have as evidence when analyzing the calling patterns.

As per claim 21, Murad et al discloses:

Further comprising retrieving profile tables to generate the profile cubes, (Col. 4, lines 36-48 and Fig. 2B [call duration vs. time of day], where profile cubes are represented by call prototype squares), retrieving call data tables to create profile-snapshot cubes that have a same dimension of a profile cube to facilitate merging by addition, (Col. 10, lines 24-25, represented by the first behavior profile for each cluster), deriving individual customer-based calling pattern cubes from the profile cubes, (Col. 8, lines 15-20, where the two input calling pattern cubes are represented by two instances of the second level profile where the second level profile represents extracted call prototypes), analyzing individual calling patterns in multiple dimensions and multiple levels, and computing a similarity of calling patterns that belong to different customer or

to a same customer over different profiling periods, (Col. 10, lines 30-37, represented by comparing to identify the deviation).

As per claim 22, Murad et al discloses:

Wherein a cell of C5 is mapped into a pair of corresponding sub-cubes of C1 and C2, (Col. 8, lines 15-20, where the two input calling pattern cubes are represented by two instances of the second level profile where the second level profile represents extracted call prototypes).

As per claim 25, Murad et al discloses:

A data warehouse for storing customer records including telephone call data, (Col. 4, lines 18-19, represented by the memory);

A profiling engine configured to communicate with the data warehouse and operative to generate customer telephone calling behavior profiles from the customer record within the data warehouse, the profiling engine being configured to define customer telephone calling behavior profiles using probability distributions, (Col. 11, lines 26-35, represented by the means for obtaining a plurality of first behavior profiles), on multi-dimensional and multi-level data cubes, one multi-level data cube being a profile cube (Col. 6, lines 55-59 represented by the daily profile), another multi-level data cube being a profile-snapshot cube, (Col. 6, line 62-Col. 7, line 2, represented by the daily prototype referred to as the second level profile processing), and yet another data cube being a profile cube formed by merging together the profile cube and the profile-snapshot cube, (Col. 7, lines 3-17, represented by the third level overall profile);

a computer application program implemented on the profiling engine and operative to represent behavior profiles as patterns, using the telephone call data, and derive similarity measures of the patterns usable to profile customer behavior and detect fraud, by deriving volume based calling pattern cubes comprising count-cubes from the profile cubes, (Col. 8, lines 61-66 w/ Col. 10, lines 30-39, where the computer application program is represented by the computer implemented method and the similarity measures are represented by the deviation from the normal behavior profile, Col. 3, lines 46-54, where call similarities or dissimilarities are obtained from the first level profile, Col. 4, lines 40-45, [where the depicted squares represent count-cubes, esp. the Nth call prototype, which represents a profile], Col. 4, lines 50-59, esp. lines 57-59 and Col. 5, lines 23-25, [where the quantitative profile which indicates the usage volume number of calls made by the customer is disclosed])

using a probability distribution-based calling pattern, treating a sub-cube as a bag, and summarizing cell-wise comparison results based on bag overlap using cell-to-subcube mapping, (Col. 7, lines 58-65, w. Col. 8, lines 10-20, where the distance factor based on the Cumulative Distribution is determined in Col. 5, lines 52-Col. 6, line 5. In this case, the distance factor based on the Cumulative Distribution represents bag overlap using probability distribution-based calling pattern since when calculating the distance factor, if the value is negative, then the daily profiles {represented by cells} would overlap)).

Murad et al fails to disclose the following, however McDonough et al discloses:

and to compute the customer telephone-calling behavior profiles using OLAP operations, (Col. 11, lines 29-34 and Col. 12, lines 50-53, where the statistics represent the customer calling behavior profiles).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to incorporate OLAP into the Murad et al patent with the motivation of accurately analyzing trends in a telecommunications environment.

As per claim 26, Murad discloses:

Wherein the computer application program is operative to implement projection cell-to-subcube mapping, (Col. 7, lines 58-65, w. Col. 8, lines 10-20, [comparing quantitative profile to third level profile where the quantitative profile represents the cell and the third level profile represents the subcube]).

As per claim 27, Murad discloses:

Wherein the computer application program is operative to implement change level cell-to-subcube mapping, (col. 7, lines 25-30, [updating a capturing changes]).

Response to Arguments

3. Applicant's arguments filed 2/3/04 have been fully considered but they are not persuasive.

The applicant argues that while Murad uses Cumulative Distribution-based (CD) distance function in determining a genuine dissimilarity between any two instances of a second level profile, the applicant's claims are directed to volume based calling pattern

cubes. However, Murad is also directed towards volume based calling patterns as shown in Col. 4, lines 57-59 where the quantitative profile indicating the usage volume number of calls made by the customer is disclosed.

The applicant also argues that prior art used does not disclose that the sub-cubes are each treated as a bag, and cell-wise comparison results are summarized based on bag overlap. However, in Col. 5, lines 52-Col. 6, line 5, Murad discloses that the distance factor based on the Cumulative Distribution is determined during a clustering operation. In this case, the distance factor based on the Cumulative Distribution represents bag overlap using probability distribution-based calling pattern since when calculating the distance factor, if the value is negative, then the daily profiles {represented by cells} would overlap. Also, not only does Murad disclose a clustering technique based on distance measurements, but also discloses that profiles are based on and measured according to volume based calling patterns as shown in Col. 4, lines 57-59 where the quantitative profile indicates the usage volume number of calls.


Conclusion


4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Akiba K Robinson-Boyce whose telephone number is 703-305-1340. The examiner can normally be reached on Monday-Friday, 8:30am-5pm.

Art Unit: 3623

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tariq, Hafiz can be reached on 703-305-9643. The fax phone numbers for the organization where this application or proceeding is assigned are 703-746-7238 [After final communications, labeled "Box AF"], 703-746-7239 [Official Communications], and 703-746-7150 [Informal/Draft Communications, labeled "PROPOSED" or "DRAFT"].

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.


A. R. B.
March 3, 2004


TARIQ R. HAFIZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3600